



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 HANFORD PROJECT OFFICE

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January 22, 2003

Mr. Bryan L. Foley
U.S. Department of Energy
P.O. Box 550, MSIN: H0-12
Richland, WA 99352

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EDMC

Re: Review of Remedial Investigation Report for the 200-TW-1, 200-TW-2 and 200-PW-5 Operable Units

Dear Mr. Foley:

The U.S. Environmental Protection Agency (EPA) and the Washington Department of Ecology (Ecology) have reviewed the document entitled, "Remedial Investigation Report for 200-TW-1 and 200-TW-2 Operable Units (includes the 200-PW-5 Operable Unit)," (DOE/RL-2002-42 Draft A). Our review comments are enclosed. The main areas of concern identified during our review are provided below.

The approach to groundwater as it relates to risk characterization is inconsistent with Hanford Advisory Board (HAB) Advice #132, "Exposure Scenarios Task Force on the 200 Area" and the Tri-Party agencies' response to same. There is a chance that institutional controls protecting against the use of groundwater may fail after 150 years (after the predicted period of active waste management), so it is important to model the contribution to groundwater contamination coming from the soil operable units reported on in this document. The drinking water pathway in the RESRAD (RESidual RADioactivity) code should be turned on when modeling the period after 150 years from present in order to predict the incremental risk to human health.

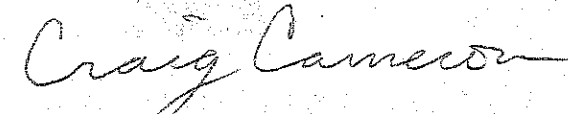
This report does not explicitly acknowledge the consideration of Native American users, which was an element of both the HAB advice and Tri-Party response. The EPA and Ecology can provide assistance to correct this oversight.

The U.S. Department of Energy has not submitted a satisfactory ecological evaluation for the 200 Area. We acknowledge that the preparation of a screening-level evaluation is in progress. Remedial investigation reports are incomplete without characterization of biota, either by reference or on a stand-alone basis. The multiple references in this report to a draft ecological evaluation are inappropriate, as that draft document has not been approved because of its substantial deficiencies.

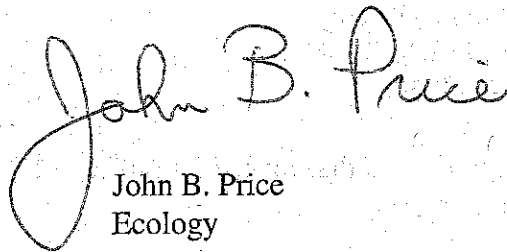


Please direct comments or concerns to Craig Cameron at (509) 376-8665 and John Price at (509) 736-3029.

Sincerely,



Craig Cameron
EPA



John B. Price
Ecology

Enclosure

cc: Bruce Ford, FHI
Ken Niles, ODOE
Administrative Record - 200-TW-1 & 200-TW-2, 200-PW-5

INDEX	PAGE/PARAGRAPH	COMMENTS
1.	General	The EPA would like to acknowledge the challenge of incorporating remedial investigation information from multiple operable units. Incorporation on this scale is something new to us all.
2.	General	A quantitative risk assessment (including a quantitative baseline) will be necessary before a final record of decision (ROD) is written. The Department of Energy has expressed a desire to go with final RODs on 200 Area soil operable units. When will a quantitative risk assessment be planned? Please explain what is planned more specifically in the document.
3.	General	One of our main concerns is with the citation of the 216-S-9 crib as a representative site for 200-PW-5 while at the same time saying that no RI activities have been conducted for this site. The fact that we agreed that the 216-S-9 crib fits within the bounds of representative sites already sampled needs to be indicated. The rationale behind this agreement needs to be included. We will expect that confirmatory sampling will demonstrate whether or not our rationale is correct.
4.	General	Some of the data in the report comes from earlier studies. Have the radionuclide activities been adjusted for nearly a decade's worth of decay?
5.	General	We wish to obtain the inputs and software for STOMP so that the USGS can replicate your vadose zone modeling runs for us.
6.	General	This RI Report cites more than one document that are not intended for review and approval by the regulator agencies (e.g., citation of <i>Hanford Site Groundwater Monitoring for Fiscal Year 2001</i> on pg. 5-3), or documents that were noted as seriously deficient and have not been approved at this date (e.g., citation of <i>Ecological Evaluation of the Hanford 200 Areas – Phase I: Compilation of Existing 200 Area Ecological Data</i> on pg. 5-12). References like the former should be used more carefully, and references to draft documents should be deleted.
7.	General	The data for 216-B-46, 216-B-5, 216-B-57 did not include organic and inorganic waste streams. How does this meet the RCRA requirements or the data needs to characterize the site for remedial action?
8.	General	The report needs to have consistency with how nitrate is expressed, inserted as NO_3^- - N or NO_3^- . When presenting the data through out the report, how is the nitrate expressed?
9.	General	The tables that have a Background and Max columns need to remove the (p/Ci) as this unit of measure does not apply to all constituents and the units are located at the other headings.
10.	General	Clarify that the Column for MTCA C Soil Cleanup Level is for direct exposure and the Column for Soil Protection of Groundwater is a MTCA B (most beneficial use) value.
11.	General	Need information on the lateral extent of contamination.
12.	General	Take out all references to pore volume and COC's.
13.	Page 1-5, ¶2	It would be nice if the Future Site Uses Working Group report was also mentioned as a source of land use guidance. Or at least reference workshops held recently on the Central Plateau.
14.	Page 1-5, ¶3	Are the cumulative cancer risks from non-radionuclides and radionuclides added for a total cancer risk?

15.	Page 1-5, ¶4	Is this graded approach to biotic doses consistent with the approach mentioned in other recent documents including the work plans for 200-TW-1 and 2 and for 200-MW-1?
16.	Page 1-6, ¶ 5	Hopefully, enough confirmatory sampling will occur so that a site will only have to be reassigned once and will not complicate completing the remediation of adjoining sites done under the ROD for this group.
17.	Section 1.1	The "Purpose" should be rewritten and re-edited. Much of the latter part of the paragraph addresses methodology rather than purpose. The "Purpose" omits a key purpose which is to evaluate whether the RI has collected data of sufficient quantity and quality to characterize the nature and extent of contamination.
18.	Section 1.2	Shouldn't the 200-BP-5 remedial investigation be referenced?
19.	Section 1.2	Was the reference "Hodges, F.N., 1995, In Preparation, Hanford B-S Reverse Well: Controls on Radionuclide Distribution, WHC-EP-0863, Westinghouse Hanford Company, Rich Washington" ever completed, and should it be included here (and the information used in this RI Report)?
20.	Section 1.3, ¶2	The reference to "detailed description of the data validation effort" in Appendix A is actually in Appendix B. This type of error, although minor, suggests that the document would benefit from re-editing at a higher level of technical edit.
21.	Section 1.3.2	The "Introduction" section would be a good place to introduce the Hanford Advisory Board (HAB) Advice #132, "Exposure Scenarios Task Force on the 200 Area" and the Tri-Party response, including the 200 Area risk framework.
22.	Section 1.3.2	This section introduces the CLUP context for land use. It should also introduce for context the Presidential Proclamation of the Hanford Reach National Monument, and especially the June 9, 2000 Presidential memo to the Secretary of Energy.
23.	Page 2-1, 2 nd ¶, last sentence	Choose either: as or because
24.	Page 2-5, ¶3 & 4.	There is no indication that this is for 200-PW-5
25.	Page 2-6, Figure 2-1	Where is borehole 299-E33-23 on this map?
26.	Section 3.2	The data from Smith (1980) appear to be relatively important to this RI. How were those data evaluated in terms of quality?
27.	Page 3-6, ¶ 2	Clearly state that groundwater will be MTCA B and soil will be MTCA C.
28.	Page 3-7, ¶ 2.	Need some specifics to know how similar the situations are for 216-B-46 and 216-B-49.
29.	Page 3-7, ¶. 2.	How were COC's chosen. Was operational history evaluated?
30.	Page 3-7, last ¶.	List Kds used and what they are based on.
31.	Page 3-8, ¶5.	Text should be added explaining the main differences between the old contaminant distribution model and the updated one. This should be done in each case where the model was updated for sites and should include the

		rationale for the changes (i.e. how new information led to a better understanding of actual conditions).
32.	Page 3-9, ¶1 & 2	<p>These paragraphs are a poorly written summary of the 200-BP-1 report and should be revised. For example:</p> <ul style="list-style-type: none"> • The first paragraph lists a range of contaminants, e.g., metals, TBP and PCBs in addition to radionuclides. The next paragraph states that "contamination was observed to a depth of 236 ft (72 m) bgs." The reader could logically conclude that metals, TBP, and PCBs are found to that depth (which probably isn't true for all). • The statement that "details of the 200-BP-1 RI are presented in DOE-RL (1993b)" is true, but: <ul style="list-style-type: none"> ○ Add a statement about the important results are provided in this RI Report (and provide those results), and ○ Indicate details of <i>what</i> (that isn't provided here). What details would be important enough for the reader to track down that other reference?
33.	Page 3-9, ¶2	Provide a cross-section.
34.	Page 3-10, ¶2	What do you think is the reason why there is a significant reduction in the level of contamination associated with the top of the sand-dominated sequence?
35.	Page 3-10, ¶2	How significant was the reduction in the levels of contamination, and significant compared to what (requires a text revision)?
36.	Page 3-10, ¶3	How significant were the concentrations of bismuth and sodium, and significant compared to what (requires a text revision)?
37.	Page. 3-11, 3.2.2.1 Page. 3-13, 3.2.2.5	The data for the 216-B-5 Reverse Well is only for the rad. COCs. When will sampling occur for the organics, and inorganic (metals)?
38.	Page 3-12, ¶3 & 4	Provide a cross-section. It is unclear where Sr-90 is located now.
39.	Page 3-13, ¶6	Note that the plutonium-239/240 is above TRU levels without counting other transuranics.
40.	Page 3-14, last ¶	What data is this paragraph based on? Any borings close by?
41.	Page 3-16, ¶1	What are the values for nitrite and phosphate?
42.	Page 3-45 & 46, Figure 3-23	Note that the 216-B-7A data for Pu-239/240 indicate TRU levels at the bottom of the crib structure around 20 feet below ground surface.
43.	Page. 3-53, Figure 3-28	<p>The figure's title is the Vertical and Lateral extent of Cesium-137 at 216-B-38 trench. How did you determine the lateral extent on the south side of the crib?</p> <p>The trench is over 300 ft in length. How is one cross section adequate characterization? Is this cross section at the point of discharge?</p>
44.	Page 3-59.	Good place to list Kds used.
45.	Page. 3-59,	Check the % volumetric moisture for the 216-B-7A Crib. The Bulk Density and % Volumetric Moisture are the

	Table 3-1	same for 216-B-7A.
46.	Page. 3-60,61,62, Table 3-2	MTCA is not the regulating authority for the rad. COC, so why not state the clean – up values that apply?
47.	Page: 3-61, Table 3-2	The MTCA value for Total Uranium is 1.05+04. Chromium III value is 5.25E + 06. Where did you get the value used for lead? Error in MTCA value for Manganese, silver, and zinc. Where did you get the values for chloride, and sulfate?
48.	Page. 3-64, Table 3-3	Where did you get the sulfate value for Protection of Groundwater?
49.	Pages. 3-65/3-66, Table 3-4	Background on Total uranium is not consistent with Table 3-3 value. Add the MTCA C direct contact value for total uranium 1.05E+04.
50.	Chapter 4: General	How did you deal with various uncertainties in inventory, model limitations, and use of stochastic vs. deterministic? The Hanford System Assessment Capability (SAC), for example, uses multiple realizations of input parameters to deal with uncertainties. The input parameters used in this modeling appear to be single values.
51.	Page 4-1, ¶1.	Has there been modeling done to help predict barrier performance for 216-B-57? It might make sense to model another 200-PW-5 site that is similar to 216-B-57 but that does not presently have a barrier. This might aid us in determining the appropriate level of performance for barrier systems that may be applied for a remedy, especially since we know that we are not likely to use the Hanford Barrier design.
52.	Page 4-1, ¶ 2	List models used.
53.	Page 4-1, ¶ 3	Take out conservative reference. Disagree.
54.	Pages. 4-1 – 4-3 Section 4.2 & 4.3	Provide the basic diagrams of the geological conceptual models of the vadose zone showing sloping layers and other heterogeneities included in the various model (include both 200 East sites and 200 West Sites)
55.	Page 4-2, ¶ 4	Second sentence. Please add the word “as” between “not” and “affected”.
56.	Page 4-3, ¶2	In what documents or databases are the moisture retention and hydraulic conductivity data to be found? Please list and add to references section.
57.	Section 4.4	RE: “Soil hydraulics properties for the different geologic units were developed from the existing database of moisture retention and unsaturated hydraulic conductivity data available at the Hanford Site:” <ul style="list-style-type: none"> • This section should be expanded to describe the site-specificity of that data relative to waste sites addressed in this RI. A location figure would be appropriate. • The Conclusions (Section 6) need to specifically address whether these data are of sufficient quantity and quality. That case should be built in this section in order to support the conclusions. For example, was Khaleel and Freeman reviewed and approved by regulatory agencies?
58.	Section 4.4	All but the first and last ¶s of this section appear to be introductory soil physics text that is not used in Section 4.

		It should be deleted.
59.	Page 4-5, ¶ 1	There is no discussion of what codes were applied to model fate and transport.
60.	Page 4-5, ¶ 2	The revision of Kds appears arbitrary. Please define how Kds were determined.
61.	Page 4-5, ¶ 2.	We wish to better understand the practice of revising distribution coefficients used in modeling to fit sampling data. Could you explain why this was done and what justifies it considering the use of modeling in this case?
62.	Page 4-6, ¶ 3	It would be a good idea to model the plutonium-239 out past 1000 years to see when and if the concentration peaks and drops off. This is especially important because the RESRAD program outputs can become unstable when one gets to the multiple thousand year time frame.
63.	Page 4-7, 1	The last sentence is very speculative
64.	Page 4-7, ¶2.	When discussing contaminants attenuating below MCLs within 200 years, what are the respective roles of diffusion versus decay for the radionuclides? In other words, is there a lot of dispersion or diffusion or is the attenuation mostly due to radioactive decay?
65.	Page 4-7, ¶ 4.63	<p>This paragraph is difficult to read and sound like it contradicts itself. The second to the last paragraph stated that none of the contaminants associated with the 216-B-7A Crib discharges have been detected in the groundwater. The last sentence states that none of these contaminants are expected to pose a threat to groundwater during the 1,000-year simulation time.</p> <p>Crib 216-B-7A received 75 times the pore volume. The 1st sentence in next the paragraph states that nitrate and technetium reached the groundwater with concentrations exceeding their MCLs almost immediately. Please rewrite using clear language.</p>
66.	Page 4-8, 4.64, 1 st ¶	<p>Same comment as above. Difficult to understand.</p> <p>Crib 216-B-38: How can none of the contaminants pose a threat to groundwater but some of the COC were above MCLs and still remain in the vadose zone?</p>
67.	Page 4-9, ¶1	What do you think is the source of the technicium-99 plume?
68.	Page 4-9, ¶3	The "B-BX-BY Field Investigation Report" does not appear in the list of references. Please have the document re-edited to check that all references are cited properly and appear in the References section.
69.	Page 4-10, ¶ 3	It is not clear what you are trying to say. We need some more explanation dealing with the modeling of different distribution coefficients for the same contaminants.
70.	Page. 4-11 Figure 4-1	Why did you use the uniform distribution of co-efficient.? Also show the "G'Zone. What is the significance of G Zone? Please clarify
71.	Pages 4-12 – 4-25	Please run all COC out past their respective peaks regardless of the time-frame.
72.	Page. 4-27 Table 4-1	Need more clarification on the hydrogeologic properties-especially on site specific data vs. regional data used in the model vs. modeled value. Why are the soil hydraulic properties used in the model kept within two standard of deviation? Please clarify.
73.	Page 4-27- 4-29,	Unclear how the Kd value was picked for the model. We seem to jump between column 2 and 3. Need to provide

	Table 4-2	justification.
74.	Break through curves	Please explain why some of the break through curves show 100 years to decay e.g. due to inventory of waste, if so how much , etc.
75.	Section 5.0	General: Were all the exposure pathways evaluated? For example: vapors, petroleum mixtures, spills, etc. An uncertainty section should be provided as described in chapter five of the HSRAM.
76.	Section 5.1, ¶2	The statement that "The 200 Area Ecological Evaluation report has additional details on the BDAC document." is misleading. One of the specific comments on the 200 Area Ecological Evaluation Report was that: <p style="margin-left: 40px;">"The BDAC has an undefined regulatory standing. Its usage as a TBC may be appropriate, but the text needs to support that use in a much better manner. The history of radiological criteria for eco-system protection would be helpful. It would be helpful to make a clear statement that there are no regulatory criteria for protecting biota from radioactivity (which does appear on pg. 1-3)."</p> This comment also applies to this RI Report, and additional explanation of BDAC should be added to this report.
77.	Page. 5-3, 2	Trucks transported waste. Had spills been evaluated?
78.	Page. 5-3, last ¶	Reference to "these" OUs in a new paragraph should be changed to "200-TW-1, 200-TW-2 and 200-PW-5 OUs."
79.	Page. 5-3, last ¶	Paragraph states that the <i>Hanford Site Groundwater Monitoring for Fiscal Year 2001</i> evaluated the risks for "these OUs" and implies that casual reader could go to that report and find the relevant discussion. Whereas the table of contents for the referenced report calls out 100 Area operable units by name, it does not do so for the 200 Area. This text should be revised.
80.	Page. 5-3, last ¶	The reference to risk assessment in the <i>Hanford Site Groundwater Monitoring for Fiscal Year 2001</i> is inappropriate because the latter document has not been reviewed and approved by the regulator agencies. The reference in this context should be deleted.
81.	Page. 5-3, last ¶	The discussion of groundwater use is inconsistent with the Tri-Party agencies response to Hanford Advisory Board (HAB) Advice #132, "Exposure Scenarios Task Force on the 200 Area" and should be revised.
82.	Page. 5-4 bullet 6	If there is an uncertainty section, where is it located?
83.	Page. 5-5 ¶ 5	Nitrate, nitrite, fluoride, etc. all have reference doses and could add to the overall risk at the site. A soil cleanup value protective of groundwater can be calculated with the model provided in the latest update of MTCA. These contaminants of concern should not be deleted.
84.	Page. 5-6 ¶ 4	Please cite the guidance that allows screening if a chemical does not have a background value. Uranium should be evaluated based on its radiochemical and non-radiochemical nephrotoxicity properties.
85.	Page.5-7 ¶ 3	Shallow zone samples were compared to method C values for soil. They should also be compared to method B soil values for the protection of groundwater. Ecology will require evaluation of the soil data to ensure that it does not impact future groundwater use.
86.	Page. 5-7, ¶ 4.	Screening may have to be performed again as the groundwater pathway should be turned on in RESRAD for the period after 150 years to indicate risks from contaminants in these operable units.
87.	Page. 5-7, ¶ 7	Please add "among others" at the end of the second sentence in order to show that this listing of site-specific values is not all inclusive. This way, you don't have to go to section 5.4.2 (or Table 5-6) to find this out.

88.	Page.5-8, ¶ 5.	The industrial scenario assumes that no groundwater from the waste sites will be used for drinking water or irrigation. HAB advice #132, dated July 11, 2002, anticipates "that groundwater contamination under the Core Zone will preclude beneficial use for the foreseeable future, which is at least the period of waste management and institutional controls (150 yrs.)". Please include an analysis of the groundwater pathway beyond 150 yrs.
89.	Page 5-8, ¶ 6.	Sites B-46, T-26, and B-57 have clean covers, yet the cover is not included in the dose calculations. The dose calculations should include a case with the cover, as this is the most realistic scenario. Calculations with no cover can also be shown as a bounding case to simulate, for example, an intruder scenario, but they should be labeled as such.
90.	Page. 5-9, ¶ 1.	Please indicate the basis for the cover thickness at site B-7A. A cover thickness of 0.3 meters is not effective for long term protection, as it will erode away in 300 years with the assumed cover erosion rate.
91.	Page 5-10, ¶ 4.	The target dose for the industrial scenario for non-radiological workers is 15 mrem/year, not 100. Obviously, the industrial scenario contains important differences in exposure and pathways from the residential scenario, but the target dose is the same. There needs to be a correction made everywhere this is in error in the document.
92.	Page. 5-11, ¶ 2	Since the target level is really 15 mrem, the statement in this paragraph that the target level isn't exceeded with a value of 17.2 is incorrect. Please rewrite to fix this.
93.	Page. 5-11, ¶ 7	Again, risk cannot be greater than 1. Please correct this problem.
94.	Page. 5-11, ¶ 7.	The risk estimates for site B-38 with no cover are greater than unity, for example a risk of 2.1 at year 0. It is impossible for the risk to be greater than 1, so any risks greater than unity should be changed.
95.	Section 5.5	We disagree that "a substantial portion of the problem formulation and toxicity evaluation elements of the screening-level risk assessment" have been completed." The <i>Ecological Evaluation of the Hanford 200 Areas – Phase I: Compilation of Existing 200 Area Ecological Data</i> was rejected because it was substantially incomplete. The U.S. Department of Energy has not submitted a satisfactory ecological evaluation for the 200 Area. This remedial investigation reports is incomplete without characterization of biota, either by reference or on a stand-alone basis.
96.	Page. 5-12 section 5.5	A discussion of non-radiological ecological risk screening needs to be added. Why were only wildlife values from table 749-3 WAC 173-340 used?
97.	Page. 5-13	DOE's technical standard for screening radionuclide concentrations harmful to biota was designed to protect populations. It is inadequate to demonstrate the required protection of individuals among threatened and endangered species. It is unclear what species require protection because DOE has not completed a screening level ecological evaluation for the 200 Area.
98.	Page 5-13	CERCLA (40 CFR 300.430) also requires evaluations to demonstrate protection of sensitive habitats. Biological surveys of the Hanford site by the Nature Conservancy have identified species that are "new to science" or unique to Hanford. The habitat of those species may qualify as "sensitive habitats" even though the species are not listed as threatened or endangered. This RI report is incomplete because it does not show (either directly or by reference) that adequate characterization has been done to demonstrate protectiveness.
99.	Page. 5-15, Figure 5-2.	The flow chart portion for A has an error. The cut off value for eliminating a direct exposure COC from consideration should be 1% not 10%. Hopefully, 10% wasn't used for the actual screening.

100.	Page. 5-26, Figure 5-12.	Both of these plots are in error since there cannot be a risk greater than 1. Please at least include some text explaining the quirk in the program when risk gets so close to 1.
101.	Page. 5-36, Table 5-2.	In the Exposure Point Concentration column, the value for copper probably needs to match the value in the Maximum Result column.
102.	Page 5-45, Table 5-6	Need to put correct reference in instead of "See Table 4-X."
103.	Page. 5-45, Table 5-6.	Table 5-6 lists the parameter values for several parameters that are not used for the selected exposure pathways. These parameters should be omitted from Table 5-6 as they only add confusion. Examples include 'Length Parallel to Aquifer Flow', 'Humidity in Air', 'Watershed area for nearby stream or pond', and 'Accuracy for water/soil computations'
104.	Page. 5-45, Table 5-6	The 'Cover Depth (Cover)' parameter values for sites B-7A and B-38 are incorrect in Table 5-6. They should be 0.3 and 3, instead of 1 and 10. The 1 and 10 refer to the cover depth in units of feet, but RESRAD requires input in units of meters.
105.	Page 5-46, Table 5-6	The listed evapotranspiration coefficient is incorrect. It should be 0.91. Please check the modeling to make sure the incorrect value was not used.
106.	Page. 5-47, Table 5-7.	Table 5-7, for site B-46, has omitted the constituent 'total uranium' (which is listed in Table 5-5). Please either include uranium in Table 5-7 for site B-46, or provide an explanation as to why it is omitted.
107.	Page. 5-47, Table.	For radionuclides that have documented Hanford Site background concentrations (given in Table 5-7), please clarify whether the background concentrations were subtracted from the maximum sampling results to obtain the RESRAD input concentrations? Although this will have a small impact at these sites because the background concentration is small compared to the maximum result, it is important to follow a standard procedure.
108.	Page. 6-1, 6.1 1 st ¶	The third 200-TW-2 representative site, 216-B-5 Reverse Well sampled for Rad. Only. How does this sampling satisfy RCRA
109.	General	The conclusions need to tie back to the purposes stated in Section 1.1, so conclusions should also be revised in response to comments about Section 1.1.
110.	General	The conclusions are very focused on the COCs for confirmatory sampling (Table 6-2). The conclusions should also make conclusions about what other type of data will be needed during confirmatory sampling: Kd would warrant some specific discussion in the conclusions.
111.	General	<p>There appears to be substantial uncertainty about the extent of contamination, e.g.</p> <ul style="list-style-type: none"> • Pg. 3-8, ¶6 "Additional assessment of potential impact to groundwater is constrained at this site because soil data were only collected to a depth of 35 ft (10.7m) bgs." • Pg. 3-8, ¶7 "... suggesting the likelihood of impact to groundwater ..." • Pg. 3-11, ¶2 "This information suggests that ..." • Pg. 3-14, last ¶ "This information indicates that ..." <p>As these representative sites are intended to provide a "worst case" conceptual model for the uncharacterized waste sites, it would be appropriate to either make more definitive conclusions or, conclude that additional RI characterization is required. The conclusions section should be revised accordingly.</p>
112.	General	This purported "conclusions" section neither summarizes nor repeats the apparently much more detailed

		conclusions elsewhere in the report (e.g., end of Section 4.6 and all of Section 4.7 – “conclusions.” Likewise Section 5 conclusions do not track well to Section 6. This RI Report reads as if separate sections were prepared by separate authors without being integrated at Section 6. The report should have a detailed technical edit that goes beyond grammatical editing.
113.	Page 6-2, ¶3.	The exposure pathway model for what OU? Do you mean the 200-TW-1 and 2 OUs? Please clarify.
114.	Page. 6-2, ¶6	Why does the contaminant distribution model and exposure model point listed only address radiation? Where in section 3.3 were these models presented?
115.	Section 6.1.2	<ul style="list-style-type: none"> This section would be a good place to draw the conclusion about whether the revised conceptual models are still valid for <u>all</u> waste sites (not just representative waste sites), which would in turn support the conclusion about whether or not the RI has collected data of sufficient quantity and quality. The waste sites could then be listed (tabulated) so that the reviewer doesn’t have to refer back to the RI work plan. Likewise, could Table 6.2 be revised to <i>conclude</i> which <i>specific</i> sites would merit confirmatory sampling?
116.	Sections 6.2 and 6.3	Sections 6.2 and 6.3 contains no “conclusions” (the major heading for Section 6.0) and should be deleted. It appears to be a re-hash of previous material regarding process, derived from the implementation plan and work plan.
117.	Page. 6-3, 6.2.1, 3 rd ¶, 3 rd line	Delete - with
118.	Page 6-4, 5 (first bullet of last set).	Does this mean that the baseline risk assessment will be documented in the FS?
119.	Page. 6-5, 6.2.3, 1 st ¶	Need spacing between the 1 st and 2 nd sentence.
120.	Page 6-5, ¶5	The second sentence about Ecology getting EPA approval isn’t well written.
121.	Page 6-6, ¶2	The second sentence about Ecology getting EPA approval isn’t well written
122.	Page 6-6, ¶2	In the last sentence, do you mean Table 6-2?
123.	Page 6-6, ¶2	We need to discuss the logic used in eliminating COCs originally provided in the work plan.
124.	Page 6.7, Table 6-1.	The total maximum excess lifetime cancer risk from radiological COCs for the 216-B-38 trench is listed as being 2.1×10^0 or 2.1. How could risk, which when provided correctly is a probability from 0 to 1, be higher than 1?
125.	Page. 6-7, Table 6-1	What are the non-radiological contaminants for the 216-B-5 Reverse Well?
126.	Page. 6-7, Table 6-1	What does the Hanford Barrier over waste site 216-B-57 have to do with the non-radiological contaminants of concern?

127.	Page. 6-7, Table 6-1	Where are the non-cancer (HQ) risks for non-radiological constituents?
128.	Page. 6-7, Table 6-1	What are you using for the MCL values for non-radiological? Direct exposure or groundwater?
129.	Page B-1, 1 (Appendix B).	What checks were done to make sure that the data from earlier studies (used for representative sites from 200-BP-1 for example) met or approximated the QA/QC and sampling requirements that the more recent 200-TW-1 and 2 field and lab work had to meet?
130.	Page B-4, Table B-1	Why isn't there a value for potassium-40 for the 197.50-198.80 split sample?
131.	Page B-5, Table B-1.	What happened to make the high uranium reading (for interval 34-36.50) only an estimate?
132.	Page B-14, Table B-5	The "B" footnote is used for methylene-chloride. However, it refers to the MDA (minimum detectable activity) which is a radiological measure. Shouldn't it say MDL (method detection limit)?
133.	Page B-24, Table B-8	Why are there two values that are exactly the same for cesium-137?
134.	Page B-26, Table B-8	How could the "B" footnote ("...result is less than reporting limit") be valid for such a high total uranium number?
135.	Page B-35, Table B-13.	What happened that caused the middle intervals to be estimates for the inorganic metals and some of the general chemicals?
136.	Appendix C	Provide reason for using different Kds for same contaminants to match the field data. Can you do a better history matching using a range of values?
137.	General	Provide specific details on the modeling parameters, e.g. size, grid pattern, etc.
138.	General	How this modeling study conforms to sitewide SAC with respect to data on inventory, release models, uncertainty, etc. Please clarify
139.	Appendices A and C	It wouldn't hurt to have some interpretive text to aid in viewing the tables, especially for the modeling in Appendix C.

EPA COMMENTS:

1-5, 13-16, 24-25, 28, 31, 34, 39, 41-42, 45, 51, 55-56, 59, 61-64, 67, 69, 86-87, 91-93, 99-102, 105, 113, 118, 120-124, 129-135, and 139.